

Table 1. Land use types and percent of total area for Cambridge, Massachusetts

Land-use type	Area (acres)	Percent of total area
Cropland	0.97	0.02
Forest	71.68	1.56
Wetland	42.46	0.93
Open Land	33.28	0.73
Participation Recreation	245.31	5.35
Water-based Recreation	5.84	0.13
Residential, Multifamily	1304.59	28.46
Residential, High Density (lots <0.25 acre)	360.23	7.86
Residential, Median Density (lots 0.25-0.5 acre)	34.23	0.75
Commercial	590.94	12.89
Industrial	551.45	12.03
Urban Open	30.97	0.68
Transportation	105.02	2.29
Waste Disposal	10.39	0.23
Water	460.86	10.05
Golf	67.13	1.46
Urban Public (schools, churches, govt offices)	505.40	11.03
Transportation Facilities	68.26	1.49
Cemeteries	94.97	2.07
Total	4583.96	100

Table 2. Characteristics of study-street sections, Cambridge, Massachusetts. Daily traffic count data and pavement-condition index data courtesy of the Cambridge Department of Public works

[ft, feet]

Street name	Study section length (ft)	Average width (ft)	Predominant land-use type	24-hr average daily traffic counts	Traffic type, direction	24-hr on-street parking	Pavement condition index- entire street (percent)	Observed pavement texture* within the study street section only	Observed pavement condition† within the study street section only	Canopy closure (percent)
Broadway	1210	40	Multifamily	20500 ²	2-way, east/west	both sides	67-80	Smooth	Good	15
Highland Ave	1072	25	Multifamily	--	one way, south	both sides	81-92	Intermediate	Fair	55
Fayette St	1287	25	Multifamily	--	one way, north	both sides	81-92	Rough	Poor	54
Cambridge St	1304	43	Commercial	14500 ¹	2-way, east/west	both sides	81-92	Smooth	Good	24
Mount Auburn St	1278	30	Commercial	9860 ²	one way, east, 2 lanes	one side	81-92	Intermediate	Fair	17
Green St	750	25	Commercial	--	one way, west	both sides	93-100	Rough	Poor	23

1, Cambridge, DPW traffic-count data, 2000

2, Cambridge, DPW traffic-count data, 2002

†, observations of the smoothness or roughness of the street surface

*, observations of breaks and open features in the street surface

Table 3. Target analytes and analytical techniques for samples submitted to SGS/XRAL Laboratories, Toronto, ON, Canada

[ICP-MS, Inductively Coupled Plasma-Mass Spectrometry; MRL, method detection limit; USEPA, U.S. Environmental Protection Agency]

Analyte	Units	Analytical techniques	MDL	USEPA Method
Aluminum, recoverable	ppm	ICP-MS	100	EPA IC3050B/ICP40
Antimony, recoverable	percent	ICP-MS	5	EPA IC3050B/ICP40
Arsenic, recoverable	ppm	ICP-MS	3	EPA IC3050B/ICP40
Barium, recoverable	ppm	ICP-MS	1	EPA IC3050B/ICP40
Beryllium, recoverable	ppm	ICP-MS	0.5	EPA IC3050B/ICP40
Bismuth, recoverable	ppm	ICP-MS	5	EPA IC3050B/ICP40
Cadmium, recoverable	percent	ICP-MS	1	EPA IC3050B/ICP40
Calcium, recoverable	ppm	ICP-MS	100	EPA IC3050B/ICP40
Chromium, recoverable	ppm	ICP-MS	1	EPA IC3050B/ICP40
Cobalt, recoverable	ppm	ICP-MS	1	EPA IC3050B/ICP40
Copper, recoverable	ppm	ICP-MS	0.5	EPA IC3050B/ICP40
Iron, recoverable	percent	ICP-MS	100	EPA IC3050B/ICP40
Lanthanum, recoverable	percent	ICP-MS	0.5	EPA IC3050B/ICP40
Lead, recoverable	ppm	ICP-MS	2	EPA IC3050B/ICP40
Lithium, recoverable	ppm	ICP-MS	1	EPA IC3050B/ICP40
Magnesium, recoverable	percent	ICP-MS	0.01	EPA IC3050B/ICP40
Manganese, recoverable	ppm	ICP-MS	2	EPA IC3050B/ICP40
Molybdenum, recoverable	ppm	ICP-MS	1	EPA IC3050B/ICP40
Nickel, recoverable	percent	ICP-MS	1	EPA IC3050B/ICP40
Phosphorus, recoverable	ppm	ICP-MS	100	EPA IC3050B/ICP40
Potassium, recoverable	percent	ICP-MS	100	EPA IC3050B/ICP40
Scandium, recoverable	ppm	ICP-MS	0.5	EPA IC3050B/ICP40
Silver, recoverable	ppm	ICP-MS	0.2	EPA IC3050B/ICP40
Sodium, recoverable	ppm	ICP-MS	100	EPA IC3050B/ICP40
Strontium, recoverable	ppm	ICP-MS	0.5	EPA IC3050B/ICP40
Tin, recoverable	ppm	ICP-MS	10	EPA IC3050B/ICP40
Titanium, recoverable	percent	ICP-MS	100	EPA IC3050B/ICP40
Tungsten, recoverable	ppm	ICP-MS	10	EPA IC3050B/ICP40
Vanadium, recoverable	ppm	ICP-MS	2	EPA IC3050B/ICP40
Yttrium, recoverable	ppm	ICP-MS	0.5	EPA IC3050B/ICP40
Zinc, recoverable	ppm	ICP-MS	0.5	EPA IC3050B/ICP40
Zirconium, recoverable	ppm	ICP-MS	0.5	EPA IC3050B/ICP40
Total organic carbon	percent	Coulometric titration	0.01	EPA 9060

Table 4. Median values and relative standard deviations for selected concentrations of total and total-recoverable trace elements in quality-control samples consisting of National Institute of Standards and Technology standard reference soil.

[NIST, National Institute of Standards and Technology; ppm, parts per million]

Analyte	NIST standard reference soil 2710 reported concentrations		NIST standard reference soil 2710 blind sample analytical results				NIST standard reference soil 2781 reported concentrations		NIST standard reference soil 2781 blind sample analytical results			
	Certified total value (ppm)	Leach range concentrations (ppm)	Total concentration		Total-recoverable concentration		Certified total value (ppm)	Leach range concentrations (ppm)	Total concentration		Total-recoverable concentration	
			Median concentration (ppm)	RSD	Median concentration (ppm)	RSD			Median concentration (ppm)	RSD	Median concentration (ppm)	RSD
Aluminum	64,400 ± 800	12,000-26,000	61,200	4	23,250	66	16,000 ¹	980-8,040	14,700	115	10,300	31
Arsenic	626 ± 38	490-600	625	2	554	9	7.82 ± 0.28	--	11	--	12	--
Barium	707 ± 51	300-400	693	1	347	48	--	65-570	579	--	517	--
Calcium	12,500 ± 300	3,800-4,800	12,100	2	4,150	71	39,000 ¹	1,830-36,440	12,100	3	36,100	5
Cadmium	21.8 ± 0.2	13-26	24	7	24.5	8	12.78 ± 0.72	1-2	11	11	12	4
Cobalt	10 ¹	6.3-12	8	16	7	25	10 ¹	--	5	--	5	--
Chromium	38 ¹	15-23	31	16	22	39	202 ¹	15-23	152	20	142	25
Copper	2,950 ± 130	2,400-3,400	2,600	9	2,730	5	627.4 ± 13.5	16-601	550	9	585	5
Iron	33,800 ± 1,000	22,000-32,000	31,300	5	27,750	14	28,000 ± 1,000	2,100-24,300	24,200	10	24,600	9
Lanthanum	34 ¹	--	26.5	18	22.4	29	--	--	17.6	--	17.4	--
Potassium	21,100 ± 1,100	3,700-5,000	19,700	5	5,700	81	4,900 ¹	--	4,100	13	2,500	46
Magnesium	8,530 ± 420	4,300-6,000	7,600	8	5,950	25	5,900 ¹	4,850-290	5,200	9	5,000	12
Manganese	10,100 ± 400	6,200-9,000	9,460	5	7,960	17	--	33-745	733	--	765	--
Molybdenum	19 ¹	13-27	17	8	15.5	14	46.7 ± 3.2	--	37	16	38	15
Sodium	11,400 ± 600	490-620	10,600	5	600	127	2,100 ¹	--	1,900	6	900	57
Nickel	14.3 ± 1.0	8.8-15	12	12	11.5	15	80.2 ± 2.3	6.3-72.3	67	13	69	11
Phosphorus	1,060 ± 150	1,060-1,100	1,000	4	900	12	24,200 ¹	--	23,400	2	22,600	5
Lead	5,532 ± 80	4,300-7,000	4,910	8	5,085	6	202.1 ± 6.5	15-183	173	11	179	9
Antimony	38.4 ± 3	--	35	7	6	103	--	--	10	--	5	--
Scandium	8.7 ¹	--	8.6	1	4.8	42	--	--	64	--	8.7	--
Silver	35.3 ± 1.5	24-30	>10	--	>10	--	98 ¹	1.7-86.3	>10	--	>10	115
Strontium	330 ¹	94-110	317	3	105	73	--	--	215	--	206	--
Titanium	2,830 ± 100	920-1,100	2,300	15	1,300	52	3,200 ¹	--	2,400	20	300	117
Tungsten	93 ¹	--	110	12	35	64	--	--	10	--	10	--
Vanadium	76.6 ± 2.3	37-50	64	13	52	28	--	3.8-81.9	77	--	80	--
Yttrium	23 ¹	--	17.4	20	14.5	32	--	--	20.4	--	17	--
Zinc	6,952 ± 91	5,200-6,900	6,340	7	6,010	10	1,273 ± 53	34-1,120	1,090	11	1,090	11

¹Noncertified value

Table 5. Analytical results of graded unground silica sand used as blank material (determined using half the detection limit for "less than" values) sourced from Ottawa, Illinois.

[E, estimated; ppm, parts per million]

	Organic carbon (percent)	Cadmium (ppm)	Chromium (ppm)	Copper (ppm)	Nickel (ppm)	Phosphorus (percent)	Lead (ppm)	Zinc (ppm)
Detection level	0.05	1.00	1.00	0.50	1.00	0.01	2.00	1.00
Maximum	E0.025	E0.05	4.00	0.90	1.00	E0.005	2.00	4.70
Average	E0.025	E0.05	2.78	0.40	0.94	E0.005	1.22	1.94
Minimum	E0.025	E0.05	1.00	E0.25	E0.50	E0.005	1.00	E0.25

Table 6A. Summary of Cambridge, MA street-dirt yields by land-use type and grain size fraction.

[mm, millimeter; μm , micrometer]

Street-dirt yield, in pounds per curb-mile				
Statistic	Total	<2mm to		
		>2mm	>125 μm	<125 μm
Multifamily residential				
Mean	701.28	270.99	357.11	66.96
Median	575.96	136.15	277.42	40.75
Minimum	168.76	11.66	95.11	6.98
Maximum	3051.96	2109.50	974.60	280.89
Commercial				
Mean	522.78	109.11	334.36	65.87
Median	466.70	62.78	307.79	61.49
Minimum	179.68	21.01	126.57	4.17
Maximum	1470.99	707.34	918.65	307.17

Table 6B. Comparison of Cambridge, MA street-dirt yields by land-use type to those in other areas of the United States, (modified from Selbig and Bannerman, 2007).

[--, no data; all values in pounds per curb-mile]

Statistic	Multifamily residential							
	Cambridge, MA	Madison, WI ¹	Champaign, IL ²	Bellevue, WA ³	Seattle, WA ⁴	San Jose, CA ⁵	Baltimore, MD ⁶	U.S. Nationwide ⁷
Mean	701	614	408	815	970	310	645	391
Median	575	569	--	705	1060	--	--	--
Commercial								
Mean	523	--	--	--	--	509	--	302
Median	467	--	--	--	--	--	--	--

1, Selbig and Bannerman, 2007

2, Bender and Terstriep, 1984

3, Pitt, 1985

4, Seattle Public Utilities and Herrera Environmental, 2009

5, Pitt, 1979

6, Law and others, 2008

7, Sartor and Boyd, 1972

Table 7. Street-dirt accumulation rates and washoff due to precipitation by land-use type. Negative values indicate a net loss of material for build up and a net increase for wash off.

[mm, millimeter; μm , micrometer]

Accumulation, in pounds per curb-mile per day				
Multifamily residential				
	<2 mm to			
Statistic	>2 mm	>125 μm	<125 μm	Total
Median	7.02	18.82	6.46	32.51
Maximum	42.49	53.96	18.28	83.45
Minimum	-37.74	-10.93	-7.08	-42.93
Commercial (all data)				
	<2 mm to			
Statistic	>2 mm	>125 μm	<125 μm	Total
Median	0.33	9.22	5.09	9.13
Maximum	49.76	186.19	71.71	307.65
Minimum	-28.18	-34.34	-4.58	-40.92
Commercial (no Mount Auburn Street data)				
	<2 mm to			
Statistic	>2 mm	>125 μm	<125 μm	Total
Median	1.64	14.85	5.95	21.73
Maximum	49.76	186.19	71.71	307.65
Minimum	-28.18	-29.15	-4.58	-22.61

Wash off, in percent				
Multifamily residential				
	<2 mm to			
Statistic	>2 mm	>125 μm	<125 μm	Total
Median	17.06	33.43	71.44	34.93
Maximum	72.16	62.72	92.53	52.47
Minimum	-286.13	-4.81	-6.42	-31.46
Commercial				
	<2 mm to			
Statistic	>2 mm	>125 μm	<125 μm	Total
Median	20.12	40.92	70.96	39.27
Maximum	81.01	66.07	94.65	62.60
Minimum	-11.32	-1.46	-52.19	2.51

Table 8. Average, median, maximum, and minimum removal efficiency, in percent, of a regenerative-air street cleaner on multifamily residential and commercial land-use streets. Negative values indicate an increase in material following a regenerative-air street-cleaner pass.

[mm, millimeter; μm , micrometer]

	Removal efficiency, in percent		
Total	Greater than 2 mm	Less thn 2 mm to greater than 125 μm	Less than 125 μm
Multifamily streets			
Average	85.03	92.88	85.64
Median	82.18	91.80	82.61
Maximum	98.90	99.68	97.88
Minimum	47.06	70.98	31.07
Commercial streets			
Average	79.31	94.09	80.97
Median	77.67	92.39	79.41
Maximum	96.68	99.76	93.52
Minimum	43.78	63.87	45.32
			-86.71

Table 9A. Total and grain-size fraction median constituent total-recoverable concentrations from composite street-dirt samples collected from streets representing multifamily residential and commercial land-use types. Bold italicized values indicate less than half the detection limit was used to determine concentration and normalized mass.

[mg/kg, milligrams per kilogram; mm, millimeter; μm , micrometer]

Analyte	Method	Total		Greater than 2 mm		Less than 2 mm to greater than 125 μm		Less than 125 μm		
		Detection limit (mg/kg)	Median concentration (mg/kg)	Standard deviation (mg/kg)	Median concentration (mg/kg)	Standard deviation (mg/kg)	Median concentration (mg/kg)	Standard deviation (mg/kg)	Median concentration (mg/kg)	
		MUTLIFAMILY STREETS								
Organic carbon	CSB03V	500	91,700	126,431	183,500	151,308	59,850	52,671	72,800	28,279
<i>Silver</i>	<i>IC3050</i>	0.2	0.10	0.25	0.10	0.06	0.10	0.06	0.10	0.40
Aluminum	IC3050	100	5,200	3,042	2,700	2,696	4,630	1,045	8,900	1,427
Arsenic	IC3050	3	4.00	13.58	1.50	22.50	4.00	2.32	10.00	3.85
Barium	IC3050	1	55	75	31	17	48	27	127	101
<i>Beryllium</i>	<i>IC3050</i>	0.5	0.25	0.17	0.25	0.14	0.25	0.16	0.25	0.20
<i>Bismuth</i>	<i>IC3050</i>	5	2.50	0.54	2.50	0.00	2.50	0.57	2.50	0.76
Calcium	IC3050	100	9,400	7,462	11,732	11,360	8,150	2,906	10,200	3,642
<i>Cadmium</i>	<i>IC3050</i>	1	0.50	0.41	0.50	0.08	0.50	0.64	0.50	0.31
Cobalt	IC3050	1	4.00	15.84	3.00	27.01	4.00	1.08	8.00	1.63
Chromium	IC3050	1	41	65	10	8	41	36	140	39
Copper	IC3050	0.5	47	160	14	128	46	217	176	46
Iron	IC3050	100	18,600	100,001	5,650	8,010	18,000	5,722	27,800	5,534
Potassium	IC3050	100	1,700	1,276	2,400	1,751	1,100	552	1,800	522
Lanthinum	IC3050	0.5	8.50	5.92	4.40	4.49	7.85	1.95	16.30	3.05
Lithium	IC3050	1	8.00	4.64	5.00	5.04	7.00	1.84	13.00	2.26
Magnesium	IC3050	0.01	0	0	0	1	0	0	0	0
Manganese	IC3050	2	272	131	202	201	247	48	350	39
Molybdenum	IC3050	1	2.00	2.05	0.50	0.92	2.00	1.39	5.00	1.05
Sodium	IC3050	0.01	0	0	0	0	0	0	0	0
Nickel	IC3050	1	15	21.15	8.00	25.59	14.00	7.45	41.00	8.17
Phosphorus	IC3050	100	700	461	800	600	500	241	900	389
Lead	IC3050	2	111	247	25	37	110	178	436	242
Antimony	IC3050	5	2.50	3.08	2.50	5.19	2.50	0.29	2.50	0.82
Scandium	IC3050	0.5	1.20	0.85	0.25	0.87	1.10	0.36	2.10	0.46
Tin	IC3050	10	10	146	5.00	65.23	5.00	14.38	20.00	240.44
Strontium	IC3050	0.5	39.70	20.96	43.35	28.41	33.55	14.70	44.30	12.34
Titanium	IC3050	100	500	353	200	216	500	134	1,000	199
Vanadium	IC3050	2	24	17	11.92	12.09	22.22	6.12	46.00	9.76
<i>Tungsten</i>	<i>IC3050</i>	10	5.00	1.95	5.00	0.00	5.00	2.91	5.00	1.76
Yttrium	IC3050	0.5	5.30	2.95	2.95	2.52	4.75	1.12	8.60	1.66
Zinc	IC3050	0.5	168.90	184.56	76.00	79.29	159.50	96.51	427.00	137.08
Zirconium	IC3050	0.5	2.70	2.82	1.20	1.89	2.65	1.53	5.90	2.82
COMMERCIAL STREETS										
Organic carbon	CSB03V	500	60,100	113,171	160,000	142,140	27,100	18,274	59,100	17,275
<i>Silver</i>	<i>IC3050</i>	0.2	0.10	0.67	0.10	0.10	0.10	0.10	0.50	0.99
Aluminum	IC3050	100	5,000	2,528	4,100	778	4,100	778	7,800	986
Arsenic	IC3050	3	5.00	4.66	4.00	2.17	4.00	2.17	11.00	4.19
Barium	IC3050	1	54	53	42	28	42	28	128	36
<i>Beryllium</i>	<i>IC3050</i>	0.5	0.25	0.15	0.25	0.04	0.25	0.04	0.25	0.17
<i>Bismuth</i>	<i>IC3050</i>	5	2.50	0.00	2.50	0.00	2.50	0.00	2.50	0.00
Calcium	IC3050	100	8,600	5,613	6,100	1,631	6,100	1,631	10,000	3,237
<i>Cadmium</i>	<i>IC3050</i>	1	0.50	0.21	0.50	0.26	0.50	0.26	0.50	0.26
Cobalt	IC3050	1	5.00	29.07	4.00	4.63	4.00	4.63	8.00	49.04
Chromium	IC3050	1	51	205	47	58	47	58	166	56
Copper	IC3050	0.5	71.78	125.30	66	99	66	99	250	96
Iron	IC3050	100	23,000	12,239	21,700	6,797	21,700	6,797	34,200	6,005
Potassium	IC3050	100	1,100	878	700	254	700	254	1,400	296
Lanthinum	IC3050	0.5	9.30	5.44	7.80	1.51	7.80	1.51	16.60	2.91
Lithium	IC3050	1	8.00	4.19	7.00	1.95	7.00	1.95	11.00	3.09
Magnesium	IC3050	0.01	0	0	0	0	0	0	0	0
Manganese	IC3050	2	270	271	237	64	237	64	358	43
Molybdenum	IC3050	1	3.00	2.96	2.00	1.72	2.00	1.72	7.00	1.86
Sodium	IC3050	0.01	300	3,544	200	1,943	200	1,943	500	2,671
Nickel	IC3050	1	18	25	15.00	31.58	15.00	31.58	48.00	9.08
Phosphorus	IC3050	100	500	656	400	166	400	166	800	288
Lead	IC3050	2	62	214	61	226	61	226	241	231
Antimony	IC3050	5	2.50	0.92	2.50	0.00	2.50	0.00	2.50	0.67
Scandium	IC3050	0.5	1.10	0.68	0.96	0.24	0.96	0.24	1.80	0.39
Tin	IC3050	10	10	210	5	11	5	11	20	361
Strontium	IC3050	0.5	33.30	24.34	22.40	6.68	22.40	6.68	40.10	10.42
Titanium	IC3050	100	500	331	400	110	400	110	900	222
Vanadium	IC3050	2	23	18	21	3	21	3	48	8
<i>Tungsten</i>	<i>IC3050</i>	10	5.00	2.92	5.00	4.12	5.00	4.12	5.00	2.95
Yttrium	IC3050	0.5	5.60	3.07	4.70	0.93	4.70	0.93	9.00	1.53

Table 9B. Total and grain-size fraction median constituent masses from composite street-dirt samples collected from streets representing multifamily residential and commercial land-use types. Bold italicized values indicate less than half the detection limit was used to determine concentration and normalized mass.

[mg/kg, milligrams per kilogram; g, grams; mm, millimeter; μm , micrometer]

Analyte	Method	Total			Greater than 2 mm		Less than 2 mm to		Less than 125 μm	
		Detection limit (mg/kg)	Median mass (g)	Standard deviation (g)	Median mass (g)	Standard deviation (g)	Median mass (g)	Standard deviation (g)	Median mass (g)	Standard deviation (g)
MULTIFAMILY STREETS										
Organic carbon	CSB03V	500	13.42	91.90	22.07	148.08	18.54	14.83	2.94	5.92
Silver	IC3050	0.2	0.02	0.05	0.01	0.05	0.03	0.04	0.01	0.06
Aluminum	IC3050	100	0.59	1.41	0.35	1.11	1.25	1.78	0.37	0.80
Arsenic	IC3050	3	0.43	5.94	0.30	9.94	1.06	1.76	0.40	0.93
Barium	IC3050	1	7.91	16.53	3.64	18.69	12.47	18.11	5.60	9.37
Beryllium	IC3050	0.5	0.03	0.09	0.03	0.10	0.07	0.09	0.01	0.04
Bismuth	IC3050	5	0.31	1.16	0.28	0.98	0.67	1.61	0.10	0.22
Calcium	IC3050	100	1.20	4.21	1.20	6.01	2.10	3.19	0.37	1.60
Cadmium	IC3050	1	0.06	0.20	0.06	0.20	0.13	0.25	0.02	0.05
Cobalt	IC3050	1	0.52	6.64	0.27	11.24	0.95	1.37	0.34	0.67
Chromium	IC3050	1	4.14	15.31	1.14	4.01	11.99	20.55	6.01	10.96
Copper	IC3050	0.5	6.49	48.46	1.49	53.11	13.01	62.43	7.61	12.63
Iron	IC3050	100	1.79	5.45	0.67	2.56	4.43	7.53	1.13	2.37
Potassium	IC3050	100	0.16	1.13	0.31	1.83	0.33	0.30	0.01	0.01
Lanthinum	IC3050	0.5	0.91	2.47	0.45	1.59	2.03	3.31	0.66	1.28
Lithium	IC3050	1	0.91	2.44	0.50	1.72	2.02	3.20	0.57	1.47
Magnesium	IC3050	0.01	0.38	0.96	0.33	1.03	0.76	1.10	0.20	0.47
Manganese	IC3050	2	33.19	88.39	28.21	113.47	66.52	85.44	12.81	27.82
Molybdenum	IC3050	1	0.17	0.65	0.07	0.49	0.47	0.84	0.20	0.37
Sodium	IC3050	0.01	0.03	2.28	0.02	1.51	0.05	3.57	0.02	0.77
Nickel	IC3050	1	1.96	7.82	1.15	10.89	4.03	6.52	1.80	3.60
Phosphorus	IC3050	100	0.08	0.29	0.08	0.45	0.14	0.15	0.03	0.08
Lead	IC3050	2	16.23	29.09	2.15	16.79	28.39	33.78	19.57	24.55
Antimony	IC3050	5	0.31	1.25	0.28	1.84	0.67	0.89	0.12	0.34
Scandium	IC3050	0.5	0.13	0.33	0.06	0.24	0.30	0.43	0.08	0.21
Tin	IC3050	10	1.58	5.71	1.42	5.12	2.66	5.73	0.71	6.21
Strontium	IC3050	0.5	4.97	19.21	4.75	27.64	8.47	14.80	1.74	5.59
Titanium	IC3050	100	0.05	0.16	0.02	0.08	0.12	0.22	0.04	0.09
Vanadium	IC3050	2	2.72	8.17	1.31	6.55	5.52	10.40	1.94	5.27
Tungsten	IC3050	10	0.60	1.69	0.55	1.97	1.35	1.80	0.20	0.37
Yttrium	IC3050	0.5	0.54	1.67	0.35	1.52	1.23	2.09	0.37	0.80
Zinc	IC3050	0.5	23.33	45.02	6.50	44.43	47.27	46.59	17.36	36.69
Zirconium	IC3050	0.5	0.31	1.26	0.15	0.61	0.74	1.84	0.26	0.76
COMMERCIAL STREETS										
Organic carbon	CSB03V	500	4.34	33.01	8.53	11.76	8.53	11.76	0.28	0.68
Silver	IC3050	0.2	0.02	0.08	0.03	0.08	0.03	0.08	0.03	0.11
Aluminum	IC3050	100	0.19	2.07	1.07	3.20	1.07	3.20	0.04	0.12
Arsenic	IC3050	3	0.44	2.38	0.99	3.57	0.99	3.57	0.57	1.82
Barium	IC3050	1	6.55	14.63	13.18	18.52	13.18	18.52	7.12	12.97
Beryllium	IC3050	0.5	0.02	0.12	0.06	0.20	0.06	0.20	0.01	0.06
Bismuth	IC3050	5	0.23	1.21	0.64	1.95	0.64	1.95	0.13	0.31
Calcium	IC3050	100	0.60	3.33	1.78	4.62	1.78	4.62	0.05	0.26
Cadmium	IC3050	1	0.05	0.25	0.13	0.40	0.13	0.40	0.03	0.06
Cobalt	IC3050	1	0.52	6.62	1.04	3.61	1.04	3.61	0.47	10.81
Chromium	IC3050	1	6.10	19.18	14.76	26.19	14.76	26.19	9.27	13.07
Copper	IC3050	0.5	8.93	21.29	20.44	28.06	20.44	28.06	14.07	15.02
Iron	IC3050	100	0.50	6.64	5.53	9.38	5.53	9.38	0.19	0.33
Potassium	IC3050	100	0.08	0.46	0.22	0.55	0.22	0.55	0.01	0.03
Lanthinum	IC3050	0.5	1.01	4.01	1.97	6.19	1.97	6.19	0.89	1.96
Lithium	IC3050	1	0.78	3.94	1.97	5.76	1.97	5.76	0.58	2.74
Magnesium	IC3050	0.01	0.19	1.27	0.77	1.91	0.77	1.91	0.02	0.08
Manganese	IC3050	2	29.00	83.06	60.93	119.22	60.93	119.22	18.59	41.11
Molybdenum	IC3050	1	0.27	0.60	0.66	0.68	0.66	0.68	0.39	0.57
Sodium	IC3050	0.01	0.01	2.60	0.05	4.43	0.05	4.43	0.002	0.13
Nickel	IC3050	1	2.09	7.49	4.19	11.10	4.19	11.10	2.57	4.46
Phosphorus	IC3050	100	0.02	0.33	0.09	0.25	0.09	0.25	0.003	0.01
Lead	IC3050	2	8.26	30.59	19.59	45.95	19.59	45.95	12.93	17.36
Antimony	IC3050	5	0.24	1.21	0.64	1.95	0.64	1.95	0.13	0.31
Scandium	IC3050	0.5	0.12	0.52	0.26	0.77	0.26	0.77	0.10	0.36
Tin	IC3050	10	1.21	5.89	1.97	5.70	1.97	5.70	1.25	6.18
Strontium	IC3050	0.5	3.23	12.02	6.69	14.26	6.69	14.26	2.06	8.96
Titanium	IC3050	100	0.01	0.22	0.11	0.35	0.11	0.35	0.00	0.01
Vanadium	IC3050	2	2.75	10.45	5.17	15.13	5.17	15.13	2.63	8.06
Tungsten	IC3050									

Table 10. Accumulation rates of constituent masses, in pounds per curb-mile per day, by grain-size fraction and land-use type from samples composites collected before and after precipitation events. Negative values indicate a net loss of material.
 [mm, millimeter; μm , micrometer]

	Organic carbon	Silver	Aluminum	Arsenic	Barium	Beryllium	Bismuth	Calcium	Cadmium	Cobalt	Chromium	Copper	Iron	Potassium
All multifamily data														
Average	1.63	0.006	0.06	0.11	0.94	0.004	0.03	0.13	0.01	0.07	0.83	0.93	0.20	0.04
Median	1.43	0.002	0.06	0.06	0.43	0.003	0.03	0.09	0.004	0.05	0.68	0.43	0.11	0.03
Maximum	16.86	0.128	0.70	1.27	41.73	0.028	0.23	0.88	0.69	0.88	4.21	7.71	1.66	0.24
Minimum	-10.45	-0.006	-0.49	-0.81	-29.41	-0.014	-0.14	-0.31	-0.51	-0.48	-10.98	-5.48	-1.22	-0.04
Multifamily data, greater than 2 millimeters														
Average	1.31	0.001	-0.016	0.013	0.115	0.001	0.008	0.042	0.002	-0.023	0.046	0.016	-0.040	0.034
Median	1.43	0.001	0.012	0.014	0.204	0.001	0.014	0.019	0.003	0.009	0.047	0.081	0.029	0.032
Maximum	16.86	0.004	0.220	0.109	1.149	0.009	0.085	0.381	0.017	0.195	1.173	0.545	1.494	0.096
Minimum	-10.45	-0.006	-0.489	-0.109	-1.968	-0.014	-0.139	-0.310	-0.028	-0.483	-1.138	-1.479	-1.215	-0.021
Multifamily data, less than 2 millimeters to greater than 125 micrometers														
Average	2.56	0.002	0.115	0.122	1.598	0.006	0.060	0.235	0.023	0.091	1.283	1.262	0.417	0.048
Median	2.87	0.002	0.089	0.176	0.311	0.005	0.049	0.163	0.010	0.076	2.266	1.248	0.385	0.049
Maximum	8.056	0.009	0.704	0.504	41.727	0.023	0.232	0.884	0.690	0.595	4.212	7.712	1.661	0.145
Minimum	-1.806	-0.001	-0.289	-0.806	-29.413	-0.001	-0.015	-0.137	-0.508	-0.184	-10.978	-5.476	-0.663	-0.037
Multifamily data, less than 125 micrometers														
Average	0.79	0.017	0.079	0.219	1.189	0.004	0.025	0.115	0.010	0.164	1.308	1.743	0.235	0.025
Median	0.64	0.003	0.074	0.148	0.866	0.002	0.017	0.079	0.003	0.075	1.303	1.388	0.199	0.002
Maximum	2.11	0.128	0.201	1.273	3.362	0.028	0.073	0.466	0.060	0.884	3.741	5.843	0.760	0.239
Minimum	-0.01	0.000	-0.025	-0.191	0.003	-0.010	-0.002	0.006	0.000	-0.001	-0.516	0.260	-0.106	-0.001
All commercial data														
Average	-0.314	0.005	0.026	0.036	0.036	0.004	0.021	0.046	0.009	0.654	1.388	0.300	0.174	0.011
Median	0.057	0.001	0.007	0.022	0.356	0.002	0.011	0.017	0.002	0.062	0.364	0.312	0.027	0.002
Maximum	4.132	0.110	0.568	0.711	3.279	0.030	0.299	0.365	0.117	16.830	46.791	8.988	1.862	0.136
Minimum	-11.631	-0.027	-0.363	-0.521	-23.362	-0.025	-0.146	-0.337	-0.029	-0.327	-36.153	-9.319	-0.723	-0.038
Commercial data, greater than 2 millimeters														
Average	-0.79	0.000	-0.001	0.01	0.04	0.002	-0.01	0.03	-0.002	0.001	0.05	-0.26	0.02	0.01
Median	0.002	0.000	0.001	0.01	-0.03	0.001	0.00	0.04	0.000	0.003	0.04	0.04	0.03	0.01
Maximum	3.586	0.006	0.387	0.314	1.599	0.020	0.066	0.292	0.013	0.265	0.491	8.988	0.664	0.121
Minimum	-11.631	-0.006	-0.363	-0.152	-0.874	-0.025	-0.141	-0.337	-0.028	-0.281	-0.501	-6.776	-0.723	-0.038
Commercial data, less than 2 millimeters to greater than 125 micrometers														
Average	-0.206	0.002	0.069	-0.012	-1.115	0.005	0.047	0.096	0.021	0.431	2.514	-0.691	0.479	0.019
Median	0.315	0.001	0.047	0.017	0.506	0.004	0.035	0.151	0.006	0.082	2.808	0.071	0.391	0.007
Maximum	4.132	0.037	0.568	0.711	3.103	0.030	0.299	0.365	0.117	4.746	46.791	5.766	1.862	0.136
Minimum	-5.340	-0.027	-0.217	-0.521	-23.362	-0.015	-0.146	-0.203	-0.029	-0.327	-36.153	-9.319	-0.594	-0.035
Commercial data, less than 125 micrometers														
Average	0.054	0.014	0.008	0.110	1.179	0.004	0.025	0.011	0.007	1.529	1.605	1.850	0.025	0.002
Median	0.055	0.006	0.006	0.091	1.029	0.002	0.020	0.008	0.004	0.084	1.253	1.762	0.022	0.001
Maximum	0.179	0.110	0.036	0.340	3.279	0.023	0.094	0.042	0.026	16.830	5.951	4.997	0.094	0.008
Minimum	-0.029	-0.019	-0.004	-0.087	-0.582	-0.001	-0.007	-0.001	-0.001	-0.084	-1.425	-2.878	-0.039	-0.001

Table 10-continued. Accumulation rates of constituent masses, in pounds per curb-mile per day, by grain-size fraction and land-use type from samples composites collected before and after precipitation events. Negative values indicate a net loss of material.
 [mm, millimeter; μm , micrometer]

	Lanthinum	Lithium	Magnesium	Manganese	Molybdenum	Sodium	Nickel	Phosphorus	Lead	Antimony	Scandium	Tin	Strontium	Titanium	Vanadium	Tungsten	Yttrium	Zinc	Zirconium
All multifamily data																			
Average	0.11	0.10	0.14	3.28	0.02	0.015	0.29	0.07	3.08	0.03	-0.04	0.17	0.52	0.03	0.34	0.06	0.24	2.98	0.02
Median	0.09	0.06	0.04	2.39	0.01	0.004	0.08	0.002	0.38	0.03	0.01	0.11	0.47	0.01	0.20	0.05	0.04	0.85	0.01
Maximum	1.35	1.45	3.92	28.39	0.41	0.324	3.89	2.36	64.09	0.23	0.18	5.92	6.36	0.86	4.07	0.46	7.17	77.64	0.98
Minimum	-0.70	-0.86	-0.38	-25.45	-0.54	-0.018	-1.48	-0.02	-42.85	-0.14	-2.11	-9.09	-3.38	-0.05	-1.63	-0.28	-0.44	-53.45	-0.57
Multifamily data, greater than 2 millimeters																			
Average	-0.007	-0.031	-0.008	1.680	-0.001	0.002	-0.009	0.004	-1.280	0.008	-0.002	0.147	0.176	-0.001	-0.059	0.016	-0.009	0.157	0.006
Median	0.036	0.024	0.021	1.447	0.002	0.001	0.024	0.001	0.070	0.014	0.003	0.069	0.197	0.001	0.063	0.029	0.015	0.463	0.007
Maximum	0.223	0.183	0.204	28.392	0.017	0.022	0.863	0.025	0.913	0.085	0.034	0.655	1.262	0.020	0.294	0.170	0.174	2.043	0.191
Minimum	-0.627	-0.860	-0.377	-25.453	-0.028	-0.010	-0.924	-0.017	-19.161	-0.139	-0.094	-0.278	-1.650	-0.033	-1.510	-0.278	-0.435	-5.626	-0.173
Multifamily data, less than 2 millimeters to greater than 125 micrometers																			
Average	0.186	0.221	0.075	5.278	0.042	0.010	0.593	0.014	5.963	0.060	0.026	0.319	0.962	0.011	0.673	0.120	0.100	4.617	0.028
Median	0.177	0.141	0.041	3.231	0.060	0.012	0.648	0.004	2.734	0.049	0.028	0.117	0.859	0.012	0.710	0.098	0.096	4.078	0.002
Maximum	1.351	1.453	0.353	25.244	0.410	0.032	3.888	0.052	64.093	0.232	0.179	2.302	6.361	0.078	4.075	0.464	0.770	77.642	0.980
Minimum	-0.698	-0.369	-0.094	-5.699	-0.537	-0.018	-1.479	-0.00012	-42.846	-0.015	-0.090	-2.686	-3.380	-0.053	-1.631	-0.029	-0.343	-53.448	-0.566
Multifamily data, less than 125 micrometers																			
Average	0.152	0.126	0.429	2.735	0.038	0.039	0.291	0.245	5.162	0.021	-0.194	-0.008	0.400	0.095	0.449	0.047	0.771	4.627	0.040
Median	0.187	0.100	0.042	2.683	0.038	0.007	0.261	0.010	5.443	0.017	0.019	0.365	0.337	0.013	0.459	0.034	0.099	3.489	0.037
Maximum	0.460	0.342	3.923	8.681	0.139	0.324	1.240	2.360	9.795	0.060	0.047	5.920	1.433	0.861	1.182	0.120	7.170	13.965	0.193
Minimum	-0.078	-0.011	-0.111	-1.409	-0.077	0.000	-0.650	-0.00004	0.028	-0.002	-2.110	-9.095	-0.012	-0.009	-0.247	-0.004	-0.153	0.145	-0.141
All commercial data																			
Average	0.098	0.097	0.022	2.380	0.042	0.021	0.360	0.005	1.175	0.024	0.014	0.543	0.313	0.003	0.256	0.113	0.060	2.950	0.072
Median	0.069	0.048	0.005	1.879	0.040	0.001	0.152	0.0004	0.029	0.018	0.010	0.077	0.229	0.001	0.176	0.036	0.042	1.280	0.016
Maximum	1.236	1.682	0.263	20.498	0.395	0.782	24.818	0.077	38.602	0.299	0.123	5.268	3.542	0.052	2.320	4.216	0.611	15.781	0.574
Minimum	-0.662	-0.409	-0.140	-15.670	-0.445	-0.470	-19.494	-0.003	-23.043	-0.146	-0.085	-1.980	-3.789	-0.037	-2.372	-2.869	-0.452	-8.997	-0.349
Commercial data, greater than 2 millimeters																			
Average	-0.04	0.03	0.01	-1.31	0.00	0.03	-0.01	0.003	-0.25	0.001	0.004	0.06	0.05	0.00	-0.03	-0.02	-0.03	-0.25	0.01
Median	0.00	0.00	0.01	-0.22	0.00	0.00	0.02	0.00005	-0.01	0.002	-0.0002	0.01	0.06	0.00	-0.01	0.00	0.13	0.01	
Maximum	0.238	0.647	0.156	4.136	0.076	0.365	0.400	0.024	0.243	0.075	0.098	0.579	3.542	0.041	0.845	0.131	0.216	2.650	0.361
Minimum	-0.662	-0.374	-0.133	-15.670	-0.059	-0.041	-0.633	-0.003	-2.349	-0.054	-0.085	-0.281	-3.789	-0.037	-1.280	-0.281	-0.452	-6.210	-0.349
Commercial data, less than 2 millimeters to greater than 125 micrometers																			
Average	0.142	0.146	0.046	4.978	0.057	0.031	0.615	0.013	1.943	0.047	0.018	1.016	0.452	0.007	0.292	0.202	0.093	2.444	0.079
Median	0.084	0.064	0.043	4.879	0.100	0.010	0.494	0.004	-0.051	0.035	0.017	0.174	0.131	0.007	0.250	0.086	0.073	2.232	0.042
Maximum	1.236	1.682	0.263	20.498	0.395	0.782	24.818	0.077	38.602	0.299	0.123	5.268	2.700	0.052	2.320	4.216	0.611	10.516	0.574
Minimum	-0.553	-0.409	-0.140	-13.880	-0.445	-0.470	-19.494	-0.003	-23.043	-0.146	-0.050	-1.573	-0.799	-0.024	-2.372	-2.869	-0.315	-8.997	-0.210
Commercial data, less than 125 micrometers																			
Average	0.197	0.120	0.004	3.472	0.067	0.001	0.474	0.001	1.834	0.025	0.021	0.550	0.442	0.001					

Table 11. Washoff of constituent masses from samples collected before and after precipitation events in terms of grain-size fraction and land-use type. Negative values indicate a net increase of material.

[mm, millimeter; μm , micrometer]

	Organic carbon	Silver	Aluminum	Arsenic	Barium	Beryllium	Bismuth	Calcium	Cadmium	Cobalt	Chromium	Copper	Iron	Potassium
All multifamily data														
Average	-26	-22	-38	11	-2	-138	-24	-15	-1	-42	-11	-28	-24	19
Median	59	39	49	62	50	38	40	54	40	60	60	51	55	65
Maximum	95	97	94	96	95	93	93	95	96	93	97	98	93	94
Minimum	-1454	-1120	-1243	-617	-1487	-6730	-1420	-1347	-1120	-1321	-886	-1478	-1082	-1064
Multifamily data, greater than 2 millimeters														
Average	-48	-29	-86	4	9	-2	8	-26	8	-86	-48	-5	-60	30
Median	42	21	42	40	31	21	21	59	21	52	10	22	25	64
Maximum	95	90	82	95	88	83	87	95	87	90	87	88	88	93
Minimum	-1196	-633	-966	-286	-339	-286	-286	-628	-286	-1321	-824	-310	-958	-367
Multifamily data, less than 2 millimeters to greater than 125 micrometers														
Average	25	17	18	2	34	-12	25	27	25	10	44	-10	26	44
Median	44	43	36	48	41	33	34	30	34	34	60	52	52	36
Maximum	85	74	71	92	73	63	63	69	63	78	97	98	79	75
Minimum	-106	-114	-122	-226	-27	-413	-64	-67	-64	-311	-38	-433	-81	-6
Multifamily data, less than 125 micrometers														
Average	-51	-55	-39	27	-51	-420	-109	-43	-37	-44	-24	-72	-33	-18
Median	70	83	76	81	75	79	75	76	75	76	77	77	76	76
Maximum	94	97	94	96	95	93	93	95	96	93	92	94	93	94
Minimum	-1454	-1120	-1243	-617	-1487	-6730	-1420	-1347	-1120	-1294	-886	-1478	-1082	-1064
All commercial data														
Average	33	-3	-25	-5	18	13	28	26	27	-13	-311	13	-19	39
Median	51	52	38	33	51	40	40	51	42	33	44	44	40	57
Maximum	96	99	96	96	97	97	95	96	95	96	94	97	95	97
Minimum	-268	-772	-958	-590	-395	-752	-249	-332	-249	-629	-15130	-354	-731	-323
Commercial data, greater than 2 millimeters														
Average	17	-5	-114	-28	-1	24	25	14	27	-85	-927	-3	-107	44
Median	41	35	-17	-6	26	18	20	29	20	-56	12	24	-15	46
Maximum	89	90	89	96	90	89	89	93	89	89	83	94	94	97
Minimum	-268	-772	-958	-405	-281	-31	-31	-118	-31	-629	-15130	-354	-731	-9
Commercial data, less than 2 millimeters to greater than 125 micrometers														
Average	45	-42	28	25	35	29	29	40	29	28	37	8	33	43
Median	52	22	38	44	47	41	41	51	41	32	55	39	40	57
Maximum	84	67	78	92	87	67	67	76	67	72	87	97	71	83
Minimum	-30	-342	-106	-195	-75	-47	-47	-23	-47	-56	-75	-252	-24	-31
Commercial data, less than 125 micrometers														
Average	41	35	23	-8	25	-12	31	27	27	31	36	35	31	33
Median	79	84	70	78	77	74	74	73	74	74	75	80	72	74
Maximum	96	99	96	94	97	97	95	96	95	96	94	95	95	97
Minimum	-253	-330	-389	-590	-395	-752	-249	-332	-249	-298	-197	-182	-259	-323

Table 11-continued. Washoff of constituent masses from samples collected before and after precipitation events in terms of grain-size fraction and land-use type. Negative values indicate a net increase of material.

[mm, millimeter; μm , micrometer]

	Lanthinum	Lithium	Magnesium	Manganese	Molybdenum	Sodium	Nickel	Phosphorus	Lead	Antimony	Scandium	Tin	Strontium	Titanium	Vanadium	Tungsten	Yttrium	Zinc	Zirconium
All multifamily data																			
Average	-83	-35	-11	3	5	19	-8	-2	-45	-7	-30	-46	-6	-21	-69	18	-69	-42	-77
Median	49	52	60	56	60	69	47	58	48	38	55	51	57	53	51	40	52	44	33
Maximum	93	95	98	93	94	97	92	93	96	93	95	99	94	93	94	93	95	97	97
Minimum	-2799	-1452	-1211	-1126	-876	-1120	-1088	-1120	-1913	-1120	-1204	-2339	-1412	-1120	-2884	-375	-2799	-1246	-2725
Multifamily data, greater than 2 millimeters																			
Average	-222	-80	-14	12	-12	31	-16	-9	-21	-6	-57	-1	5	-49	-171	8	-168	-96	-78
Median	-32	49	71	42	21	49	28	39	33	21	40	40	62	49	15	21	38	33	-31
Maximum	92	83	98	91	90	94	87	90	85	91	95	95	89	83	88	87	86	88	97
Minimum	-2799	-1037	-523	-230	-286	-163	-326	-467	-621	-286	-1204	-358	-395	-468	-2884	-286	-2799	-1020	-636
Multifamily data, less than 2 millimeters to greater than 125 micrometers																			
Average	22	26	18	29	44	44	32	31	-26	22	1	31	25	22	22	25	15	18	-23
Median	40	34	20	46	60	63	45	39	28	33	48	43	29	44	34	39	37	23	
Maximum	76	81	71	64	93	86	89	66	70	63	87	95	63	77	69	63	76	85	78
Minimum	-93	-92	-106	-86	-110	-64	-85	-39	-467	-64	-426	-114	-64	-119	-128	-64	-248	-289	-558
Multifamily data, less than 125 micrometers																			
Average	-31	-47	-38	-31	-14	-21	-39	-27	-90	-39	-30	-173	-50	-34	-46	22	-38	-41	-129
Median	79	80	75	75	76	86	77	76	75	75	77	52	77	75	75	79	73	84	
Maximum	93	95	94	93	94	97	92	93	96	93	94	99	94	93	94	93	95	97	96
Minimum	-1094	-1452	-1211	-1126	-876	-1120	-1088	-1120	-1913	-1120	-1120	-2339	-1412	-1120	-1323	-375	-1208	-1246	-2725
All commercial data																			
Average	-33	-12	-7	-10	-2	41	0	30	12	28	-21	-34	33	-9	-11	26	-15	31	-31
Median	34	47	43	44	63	74	42	48	64	40	43	26	52	40	40	33	52	28	
Maximum	95	96	96	95	96	98	95	99	96	97	96	99	96	95	95	95	97	96	
Minimum	-1402	-819	-847	-911	-1338	-365	-637	-214	-1004	-249	-1056	-2360	-289	-557	-401	-249	-892	-410	-1791
Commercial data, greater than 2 millimeters																			
Average	-147	-76	-71	-79	-67	36	-21	16	26	25	-96	8	33	-77	-83	21	-90	31	-122
Median	-24	8	33	10	44	65	13	34	46	20	27	14	38	-45	-48	18	-43	42	0
Maximum	95	89	94	92	89	98	84	99	90	89	89	94	89	89	89	87	92	92	
Minimum	-1402	-819	-847	-911	-1338	-220	-393	-176	-118	-75	-1056	-362	-83	-557	-401	-59	-892	-61	-1791
Commercial data, less than 2 millimeters to greater than 125 micrometers																			
Average	29	26	35	32	39	57	-13	40	-5	29	23	15	38	33	35	29	25	45	12
Median	38	24	35	42	72	74	29	51	72	41	36	22	48	41	41	40	40	26	
Maximum	75	74	75	69	89	96	77	89	96	67	76	94	82	78	80	67	71	92	63
Minimum	-36	-131	-5	-40	-103	-13	-637	-18	-1004	-47	-129	-89	-44	-96	-41	-47	-84	-12	-66
Commercial data, less than 125 micrometers																			
Average	35	23	24	29	33	33	34	38	14	32	23	-131	29	27	28	31	31	18	29
Median	71	76	73	70	80	82	75	77	73	74	72	54	74	68	76	74	72	79	74
Maximum	95	96	96	95	96	98	95	96	95	97	96	99	96	95	95	95	97	96	
Minimum	-236	-423	-354	-265	-249	-365	-189	-214	-347	-249	-372	-2360	-289	-336	-315	-249	-278	-410	-264

Table 12A. Total and grain-size fraction median constituent percent reductions from seasonal composite street-dirt samples collected before and after a single pass of a regenerative-air street cleaner on streets representing multifamily residential land-use. Bold italicized values indicate less than half the detection limit was used to determine concentration and normalized mass. Negative values indicate a potential net increase of a constituent.

[mm, millimeter; μm , micrometer]

Analyte	Spring composite--samples collected in May and June				Summer composite--samples collected in July				Fall composite--samples collected in October through			
	Multifamily streets median percent reduction				Multifamily streets median percent reduction				Multifamily streets median percent reduction			
	Total	Greater than 2 mm	Less than 2 mm to greater than 125 μm	Less than 125 μm	Total	Greater than 2 mm	Less than 2 mm to greater than 125 μm	Less than 125 μm	Total	Greater than 2 mm	Less than 2 mm to greater than 125 μm	Less than 125 μm
Organic carbon	80	93	87	60	87	93	90	57	94	97	96	81
<i>Silver</i>	78	92	83	55	84	93	93	66	94	98	92	66
Aluminum	78	90	84	60	79	91	87	42	93	98	59	37
Arsenic	70	98	66	55	77	90	83	11	90	94	73	-171
Barium	85	91	85	62	80	90	83	12	93	98	92	46
<i>Beryllium</i>	78	92	83	55	84	93	86	66	94	98	92	66
<i>Bismuth</i>	78	92	83	55	84	93	86	66	94	98	92	66
Calcium	79	90	88	57	89	96	85	48	93	98	94	78
<i>Cadmium</i>	78	92	83	55	84	93	86	66	94	98	92	66
Cobalt	67	85	83	50	84	93	86	31	94	99	59	32
Chromium	55	87	76	60	80	89	82	18	98	97	84	-81
Copper	74	97	78	70	90	88	92	21	97	99	88	-141
Iron	75	89	81	58	80	90	86	48	95	95	49	23
Potassium	86	96	87	66	90	96	88	50	94	98	94	69
Lanthinum	76	88	81	54	71	88	85	23	92	81	4	11
Lithium	75	86	85	65	82	83	90	59	95	97	59	42
Magnesium	70	89	84	57	85	93	87	50	94	98	80	51
Manganese	75	88	84	58	81	88	88	57	94	96	87	51
Molybdenum	67	96	74	55	84	93	86	43	98	95	84	15
Sodium	85	92	83	67	84	93	72	-3	90	91	76	32
Nickel	69	85	77	58	80	90	83	10	95	97	85	-88
Phosphorus	82	94	86	64	99	100	99	97	94	96	93	66
Lead	70	94	62	64	80	85	83	-13	93	97	57	-18
Antimony	78	92	83	55	84	93	86	66	94	98	92	66
Scandium	72	81	84	62	84	88	86	44	95	98	64	32
Tin	94	96	97	70	92	97	44	-37	98	98	92	-1050
Strontium	80	92	84	60	85	90	88	45	92	98	94	78
Titanium	82	92	86	60	84	91	86	48	94	98	51	24
Vanadium	72	87	81	53	79	91	86	31	95	98	63	26
<i>Tungsten</i>	78	92	83	55	84	93	86	66	94	98	92	66
Yttrium	78	90	84	54	79	88	86	41	94	91	61	27
Zinc	77	94	81	62	76	95	85	22	95	98	86	13
Zirconium	78	74	86	52	79	87	82	59	94	98	82	2

Table 12B. Total and grain-size fraction median constituent percent reductions from seasonal composite street-dirt samples collected before and after a single pass of a regenerative-air street cleaner on streets representing commercial land-use. Bold italicized values indicate less than half the detection limit was used to determine concentration and normalized mass. Negative values indicate a potential net increase of a constituent.

[mm, millimeter; μm , micrometer]

Spring composite--samples collected in May and June						Summer composite--samples collected in July through September						Fall composite--samples collected in October through December					
Analyte	Commercial streets median percent reduction					Total	Commercial streets median percent reduction					Total	Commercial streets median percent reduction				
	Total	Greater than 2 mm	Less than 2 mm to greater than 125 μm	Less than 125 μm	125 μm		Total	Greater than 2 mm	Less than 2 mm to greater than 125 μm	Less than 125 μm	125 μm		Total	Greater than 2 mm	Less than 2 mm to greater than 125 μm	Less than 125 μm	125 μm
Organic carbon	70	94	78	59		83	91	79	72			92	96	93	85		
<i>Silver</i>	37	85	73	82		37	91	35	61			88	96	89	73		
Aluminum	51	47	75	56		74	86	76	68			83	96	87	74		
Arsenic	72	97	62	53		79	82	86	56			79	97	88	73		
Barium	54	96	60	63		84	88	83	74			84	98	86	76		
<i>Beryllium</i>	69	92	73	58		79	91	78	66			88	96	89	73		
<i>Bismuth</i>	69	92	73	58		79	91	78	66			88	96	89	73		
Calcium	54	92	74	61		71	73	82	70			83	98	93	79		
<i>Cadmium</i>	69	92	73	58		79	91	78	66			88	96	89	73		
Cobalt	45	-8	66	62		53	85	68	59			86	93	89	73		
Chromium	59	80	64	66		66	84	65	68			93	97	87	73		
Copper	30	90	11	60		31	84	29	62			90	97	87	60		
Iron	64	82	65	61		74	84	73	62			86	93	86	68		
Potassium	72	97	79	62		84	94	78	72			84	98	90	79		
Lanthinum	68	92	68	60		74	86	73	67			86	87	89	74		
Lithium	53	54	73	58		72	85	75	69			83	89	88	73		
Magnesium	55	59	75	57		70	83	77	67			85	93	88	76		
Manganese	58	94	71	59		76	83	78	64			87	94	85	72		
Molybdenum	48	96	31	63		86	91	86	66			94	96	68	73		
Sodium	69	96	73	58		79	63	78	81			83	98	89	77		
Nickel	64	86	71	66		71	83	70	62			91	95	87	70		
Phosphorus	62	96	73	63		97	99	97	98			83	97	89	79		
Lead	73	98	76	66		65	90	63	57			93	98	95	78		
Antimony	69	92	73	58		79	91	78	66			88	98	89	73		
Scandium	53	54	75	58		77	88	74	66			83	88	87	79		
Tin	84	92	73	58		58	82	14	66			94	96	89	91		
Strontium	66	93	77	64		73	83	75	68			81	97	93	78		
Titanium	61	61	73	58		74	77	73	63			80	94	85	77		
Vanadium	61	50	70	58		72	87	75	65			87	94	88	76		
<i>Tungsten</i>	69	92	73	58		79	91	78	66			88	96	89	73		
Yttrium	73	93	77	59		73	87	75	69			86	87	89	75		
Zinc	70	96	60	63		75	85	74	73			86	99	88	80		
Zirconium	60	90	71	44		79	89	77	70			88	96	84	71		

Table 13. Source-area designations and respective areas as input to SLAMM model within the commercial subcatchment, Cambridge, Massachusetts

Subcatchment source areas	Multifamily and high-density residential land use (acres)	Commercial land use (acres)	Public/urban/institutional land use (acres)	Total area (acres)	Source area proportion of total (percent)
Roofs flat	1.69	3.17	1.37	6.24	28.66
Roofs-flat, disconnected	0.47	--	--	0.47	2.16
Roofs-pitched	0.57	0.56	0.13	1.26	5.80
Roofs-pitched, disconnected	0.01	0.09	0.05	0.15	0.68
Paved parking/storage	0.62	1.73	0.47	2.81	12.93
Driveways	0.61	0.76	0.04	1.41	6.50
Driveways-disconnected	0.04	--	--	0.04	0.18
Sidewalks/walks	0.54	1.22	0.11	1.87	8.59
Sidewalks/walks-disconnected	0.07	--	0.14	0.21	0.98
Street area	0.82	2.23	0.46	3.52	16.15
Large/small landscaped area	2.48	0.40	0.90	3.78	17.37
Total subcatchment area (acres)	7.93	10.16	3.67	21.76	
Proportion of total area (percent)	36.45	46.70	16.86		

Table 14. Parameter files and other model data required to develop SLAMM

[SSC; suspended sediment concentrations]

Parameter file name	File type	Description	Initial data source	Regional source data
Rain	*.RAN	Rainfall depths, durations and interevent time periods; Special rain file contains typical rain duration data to determine percent contribution of runoff from each source area, for various rain events	National Climatic Data Center, Boston Logan AP; Cambridge Department of Public Works; U.S. Geological Survey MA-RI WSC; Northeast Regional Climatic Center Bannerman and others, 1983; Pitt and others, 2005a, b, and c; Pitt and Shawley, 1981; Pitt, 1982; Pitt and McLean, 1984; and Shelley and Gadoury, 1985	National Climatic Data Center, Boston Logan AP Verified runoff coefficients from 8 study sites in Milwaukee and 2 sites in Toronto. Modified verified runoff coefficient file to better match 1999-2000 runoff data and runoff data
Runoff coefficient	*.RSV	Contains volumetric runoff coefficients for each surface type for various rain depths. Must be calibrated before any other parameter files are evaluated.	Bannerman and others, 1983; Pitt and others, 2005a, b, and c; Pitt and Shawley, 1981; Pitt, 1982; Pitt and McLean, 1984; and Shelley and Gadoury, 1985	no modifications
Particulate solids concentration	*.PSC	Describes SSC for each source area and land use for several rain categories (except road and highway surfaces)	Bannerman and others, 1983; Pitt and others, 2005a, b, and c; Pitt and Shawley, 1981; Pitt, 1982; Pitt and McLean, 1984; and Shelley and Gadoury, 1986	not used-obsolete file
Particulate residue reduction (Particulate solids delivery)	*.PRR	Calibrates source-area predictions of SSC to outfall observations to account for deposition of particulates within the storm drainage system	Bannerman and others, 1983; Pitt and others, 2005a, b, and c; Pitt and Shawley, 1981; Pitt, 1982; Pitt and McLean, 1984; and Shelley and Gadoury, 1986	no modifications
Street-dirt delivery	*.STD	More accurately accounts for deposition of street-dirt washoff material	Bannerman and others, 1983; Pitt and others, 2005a, b, and c; Pitt and Amy, 1973; Pitt, 1979; Pitt and Shawley, 1981; Pitt, 1982; Pitt and Sutherland, 1982; Pitt and Bozeman, 1982; Pitt, 1984; Pitt and McLean, 1984; Sartor and Boyd, 1972; Shaheen, 1975; Shelley and Gadoury, 1986; and Terstriep and others, 1982	no modifications
Pollutant probability distribution (Event particulate solids loading)	*.PPD	Particulate pollutant concentrations related to particulate and filterable pollutant concentrations for each source area and land use (optional unless modeling chemical constituents)	National Urban Runoff Program data,	no modifications
Particle Size Diameter	*.CPZ	Critical particle size		not used for street-cleaning simulations

Table 15. WinSLAMM productivity-function coefficients and estimated reductions of total solids and particulate solids and total phosphorus and total particulate phosphorus using three different street-cleaning technologies

Constituent	MECHANICAL BRUSH m=0.73 B=310 percent reduction	VACUUM-ASSIST m=0.71 B=41 percent reduction	REGENERATIVE-AIR m=0.07 B=70 percent reduction
Monthly			
Total Solids	2.72	5.21	15.94
Total Particulate Solids	4.20	8.16	26.55
Total P	1.41	2.75	8.04
Total Particulate P	2.05	4.03	12.09
Bimonthly			
Total Solids	3.28	6.98	18.03
Total Particulate Solids	5.08	11.06	30.41
Total P	1.69	3.67	8.34
Total Particulate P	2.46	5.41	12.35
Weekly			
Total Solids	4.21	9.61	18.44
Total Particulate Solids	6.57	15.45	31.17
Total P	2.15	5.04	8.66
Total Particulate P	3.14	7.47	13.06
Three times per week			
Total Solids	6.01	14.46	19.12
Total Particulate Solids	9.47	23.89	32.43
Total P	3.05	7.45	9.26
Total Particulate P	4.48	11.16	13.99

Table 16. Street-dirt composite sample collection dates, start times, locations, intake nozzle widths and resulting masses and yields

[in, inches, feet; g, grams; lbs/curb-mi, pounds per curb-mile]

Date	Start time	24-hour precipitation depth (in)	48-hour precipitation depth (in)	72-hour precipitation depth (in)	Sample street name	Vacuum nozzle width (ft)	Wet sample mass (g)	Dry sample mass (g)	Moisture content (percent)	Sample mass >2mm (g)	Sample mass <2mm to >125μm (g)	Sample mass <125μm (g)	Street-dirt yield <2mm (lb/curb-mi)	Street-dirt yield >2mm (lb/curb-mi)	Street-dirt yield >125μm (lb/curb-mi)	Street-dirt yield <125μm (lb/curb-mi)
MULTIFAMILY DATA																
5/18/2010	12:20	0.00	0.00	0.00	Broadway	0.50	553.23	545.98	0.01	61.07	387.61	93.04	634.21	70.94	450.25	108.08
5/18/2010	13:30	0.00	0.00	0.00	Fayette	0.50	441.48	425.99	0.04	67.09	282.63	79.08	494.83	77.93	328.30	91.86
5/18/2010	13:00	0.00	0.00	0.00	Highland	0.50	267.22	257.65	0.04	39.70	162.55	58.78	299.29	46.12	188.82	68.28
5/19/2010	12:20	1.48	0.00	0.00	Broadway	0.50	249.38	238.63	0.04	17.00	180.32	15.50	277.19	19.75	209.46	18.00
5/19/2010	13:30	1.48	0.00	0.00	Fayette	0.50	382.39	201.06	0.47	41.60	134.52	22.80	233.55	48.32	156.34	26.48
5/19/2010	13:00	1.48	0.00	0.00	Highland	0.50	181.17	161.99	0.11	41.74	107.82	14.47	188.17	48.49	125.24	16.81
6/24/2010	5:20	0.00	0.11	0.00	Broadway	0.48	775.88	762.69	0.02	59.20	550.01	154.25	924.46	71.76	666.67	186.97
6/24/2010	6:30	0.00	0.11	0.00	Fayette	0.48	291.57	279.83	0.04	64.33	181.81	33.51	346.41	79.64	225.07	41.48
6/24/2010	6:00	0.00	0.11	0.00	Highland	0.48	207.80	195.73	0.06	43.25	125.60	26.77	242.30	53.54	155.49	33.14
6/24/2010	19:20	0.21	0.11	0.00	Broadway	0.48	477.68	451.96	0.05	48.95	367.43	32.15	547.82	59.33	445.36	38.97
6/24/2010	20:30	0.21	0.11	0.00	Fayette	0.48	194.27	145.32	0.25	49.09	88.18	5.64	179.90	60.77	109.16	6.98
6/24/2010	20:00	0.21	0.11	0.00	Highland	0.48	200.05	136.32	0.32	48.01	76.83	12.12	168.76	59.43	95.11	15.00
7/7/2010	6:20	0.00	0.00	0.00	Broadway	0.48	1071.91	1043.90	0.03	95.82	719.41	229.22	1279.22	117.42	881.58	280.89
7/7/2010	7:30	0.00	0.00	0.00	Fayette	0.48	614.89	593.90	0.03	113.55	356.66	120.13	712.13	136.15	427.66	144.04
7/7/2010	7:00	0.00	0.00	0.00	Highland	0.48	409.55	386.02	0.06	78.93	238.41	69.37	467.90	95.67	288.98	84.08
7/28/2010	18:20	0.00	0.00	0.00	Broadway	0.48	1196.37	1178.78	0.01	191.30	804.06	185.48	1428.80	231.88	974.60	224.82
7/28/2010	19:30	0.00	0.00	0.00	Fayette	0.48	551.21	530.47	0.04	92.69	337.29	103.40	642.98	112.35	408.83	125.33
7/28/2010	19:00	0.00	0.00	0.00	Highland	0.48	384.68	368.35	0.04	57.24	211.44	101.98	446.48	69.38	256.29	123.61
7/29/2010	14:20	0.05	0.00	0.00	Broadway	0.48	936.45	914.92	0.02	171.61	650.81	93.02	1108.98	208.01	788.85	112.75
7/29/2010	15:30	0.05	0.00	0.00	Fayette	0.48	360.77	344.96	0.04	77.12	227.47	39.82	418.13	93.48	275.72	48.27
7/29/2010	15:00	0.05	0.00	0.00	Highland	0.48	327.41	317.35	0.03	45.20	221.61	49.11	384.66	54.79	268.61	59.53
8/26/2010	6:20	2.39	2.00	0.54	Broadway	0.48	433.65	426.18	0.02	60.31	315.62	47.88	516.57	73.10	382.56	58.04
8/26/2010	7:30	2.39	2.00	0.54	Fayette	0.48	204.10	200.14	0.02	9.62	153.35	31.29	242.59	11.66	185.88	37.93
8/26/2010	7:00	2.39	2.00	0.54	Highland	0.48	--	--	--	--	--	--	--	--	--	--
8/27/2010	6:20	0.00	2.39	2.00	Broadway	0.48	--	--	--	--	--	--	--	--	--	--
8/27/2010	7:30	0.00	2.39	2.00	Fayette	0.48	278.95	259.07	0.07	58.42	169.69	31.17	314.02	70.81	205.68	37.78
8/27/2010	7:00	0.00	2.39	2.00	Highland	0.48	199.95	184.07	0.08	42.30	116.80	21.29	233.11	51.27	141.57	25.81
8/30/2010	6:20	0.00	2.39	2.00	Broadway	0.48	784.58	777.96	0.01	106.76	539.13	123.49	941.33	129.18	652.35	149.42
8/30/2010	7:30	0.00	2.39	2.00	Fayette	0.48	456.02	448.63	0.02	87.67	291.50	66.99	542.84	106.32	352.72	81.06
8/30/2010	7:00	0.00	2.39	2.00	Highland	0.48	308.91	293.47	0.05	71.32	173.71	47.86	355.10	86.30	210.19	57.91
9/1/2010	6:20	0.00	0.00	0.00	Broadway	0.48	758.85	750.48	0.01	103.40	531.50	124.10	908.08	116.76	643.11	150.16
9/1/2010	7:30	0.00	0.00	0.00	Fayette	0.48	660.57	620.05	0.06	193.21	349.10	75.80	750.26	233.78	422.41	91.72
9/1/2010	7:00	0.00	0.00	0.00	Highland	0.48	418.43	359.63	0.14	137.44	167.20	30.30	435.15	166.30	202.31	36.66
9/3/2010	6:20	0.00	0.00	0.00	Broadway	0.48	973.79	954.72	0.02	138.00	662.40	154.70	1155.21	166.98	801.50	187.19
9/3/2010	7:30	0.00	0.00	0.00	Fayette	0.48	530.31	511.89	0.03	99.64	322.00	90.03	619.39	120.56	389.62	108.94
9/3/2010	7:00	0.00	0.00	0.00	Highland	0.48	423.98	399.49	0.06	121.40	228.40	52.31	483.38	146.89	276.36	63.30
9/5/2010	12:20	0.00	0.54	0.00	Broadway	0.48	928.48	921.29	0.01	115.00	693.60	111.46	1114.76	139.15	839.26	134.87
9/5/2010	13:30	0.00	0.54	0.00	Fayette	0.48	623.90	605.32	0.03	136.70	372.30	97.29	732.44	165.41	450.48	117.72
9/5/2010	13:00	0.00	0.54	0.00	Highland	0.48	342.49	326.88	0.05	99.95	194.60	33.79	395.52	120.94	235.47	40.89
9/27/2010	10:20	0.12	0.00	0.00	Broadway	0.48	874.09									

Table 16-continued. Street-dirt composite sample collection dates, start times, locations, intake nozzle widths and resulting masses and yields

[in, inches, feet; g, grams; lbs/curb-mi, pounds per curb-mile]

Date	Start time	24-hour	48-hour	72-hour	Sample street name	Vacuum nozzle width (ft)	Wet sample mass (g)	Dry sample mass (g)	Moisture content (percent)	Sample mass >2mm (g)	Sample mass <2mm to >125μm (g)	Sample mass <125μm (g)	Street-dirt yield (lb/curb-mi) (lb/curb-mi)	Street-dirt yield >2mm (lb/curb-mi) (lb/curb-mi)	Street-dirt yield >125μm (lb/curb-mi) (lb/curb-mi)	Street-dirt yield <125μm (lb/curb-mi) (lb/curb-mi)
		precipitation depth (in)	precipitation depth (in)	precipitation depth (in)												
COMMERCIAL DATA																
05/18/10	12:00	0.00	0.00	0.00	Cambridge	0.50	333.26	324.00	0.03	27.55	230.08	62.86	376.36	32.00	267.26	73.02
05/18/10	13:50	0.00	0.00	0.00	Green	0.50	386.10	380.46	0.01	23.51	276.56	76.44	441.94	27.31	321.25	88.79
05/18/10	12:40	0.00	0.00	0.00	Mt. Auburn	0.50	306.44	299.75	0.02	37.10	195.78	61.59	348.19	43.10	227.42	71.54
05/19/10	12:00	1.48	0.00	0.00	Cambridge	0.50	196.11	156.38	0.20	30.14	120.01	4.80	181.65	35.01	139.40	5.58
05/19/10	13:50	1.48	0.00	0.00	Green	0.50	208.01	200.55	0.04	24.15	153.80	22.20	232.96	28.05	178.65	25.79
05/19/10	12:40	1.48	0.00	0.00	Mt. Auburn	0.50	167.06	155.91	0.07	29.42	115.67	10.84	181.11	34.17	134.36	12.59
06/24/10	5:00	0.00	0.11	0.00	Cambridge	0.48	390.19	356.57	0.09	37.23	275.35	42.33	441.41	46.09	340.87	52.40
06/24/10	6:50	0.00	0.11	0.00	Green	0.48	413.03	406.92	0.01	33.88	301.58	69.15	503.74	41.94	373.34	85.60
06/24/10	5:40	0.00	0.11	0.00	Mt. Auburn	0.48	372.57	366.36	0.02	45.91	246.14	71.44	453.53	56.83	304.71	88.44
06/24/10	19:00	0.21	0.11	0.00	Cambridge	0.48	278.59	261.19	0.06	25.66	209.36	26.18	323.34	31.77	259.18	32.41
06/24/10	20:50	0.21	0.11	0.00	Green	0.48	290.67	276.08	0.05	26.11	212.51	36.35	341.77	32.32	263.07	45.00
06/24/10	19:40	0.21	0.11	0.00	Mt. Auburn	0.48	221.09	204.61	0.07	38.59	141.02	23.12	253.29	47.77	174.57	28.62
07/07/10	6:00	0.00	0.00	0.00	Cambridge	0.48	544.29	521.83	0.04	58.28	364.01	95.44	632.51	70.64	441.22	115.68
07/07/10	7:50	0.00	0.00	0.00	Green	0.48	484.83	476.17	0.02	33.97	329.08	105.62	570.96	40.73	394.59	126.65
07/07/10	6:40	0.00	0.00	0.00	Mt Auburn	0.48	422.08	410.55	0.03	40.59	282.91	82.95	492.28	48.67	339.23	99.46
07/28/10	18:00	0.00	0.00	0.00	Cambridge	0.48	536.68	520.31	0.03	68.24	355.09	96.82	630.67	82.71	430.41	117.36
07/28/10	19:50	0.00	0.00	0.00	Green	0.48	584.57	576.57	0.01	34.19	428.57	112.97	698.86	41.44	519.47	136.93
07/28/10	18:40	0.00	0.00	0.00	Mt Auburn	0.48	467.07	457.96	0.02	36.39	321.27	100.11	555.10	44.11	389.41	121.34
07/29/10	14:00	0.05	0.00	0.00	Cambridge	0.48	356.42	349.81	0.02	31.92	268.31	50.00	424.01	38.69	325.22	60.61
07/29/10	16:00	0.05	0.00	0.00	Green	0.48	355.38	349.67	0.02	27.31	266.47	56.00	423.84	33.10	322.99	67.88
07/29/10	14:40	0.05	0.00	0.00	Mt Auburn	0.48	346.87	338.17	0.03	31.83	251.89	53.93	409.90	38.58	305.32	65.37
08/26/10	6:00	2.39	2.00	0.54	Cambridge	0.48	267.91	262.05	0.02	29.31	206.29	25.07	317.63	35.53	250.05	30.39
08/26/10	7:50	2.39	2.00	0.54	Green	0.48	251.70	228.36	0.09	63.83	144.70	19.16	276.80	77.37	175.39	23.22
08/26/10	6:40	2.39	2.00	0.54	Mt Auburn	0.48	910.20	851.09	0.06	220.22	552.45	78.88	1031.61	266.93	669.63	95.61
08/27/10	6:00	0.00	2.39	2.00	Cambridge	0.48	--	--	--	--	--	--	--	--	--	--
08/27/10	7:50	0.00	2.39	2.00	Green	0.48	233.87	226.82	0.03	17.34	169.20	39.59	274.93	21.02	205.09	47.99
08/27/10	6:40	0.00	2.39	2.00	Mt Auburn	0.48	--	--	--	--	--	--	--	--	--	--
08/30/10	6:00	0.00	0.00	2.39	Cambridge	0.48	630.43	626.09	0.01	50.89	494.47	77.22	757.57	61.58	598.31	93.44
08/30/10	7:50	0.00	0.00	2.39	Green	0.48	335.34	331.76	0.01	23.90	256.41	50.17	401.43	28.92	310.26	60.71
08/30/10	6:40	0.00	0.00	2.39	Mt Auburn	0.48	697.75	690.18	0.01	171.60	411.50	100.85	835.12	207.64	497.91	122.03
09/01/10	6:00	0.00	0.00	0.00	Cambridge	0.47	617.20	573.16	0.07	53.80	413.40	87.51	708.28	66.48	510.86	108.14
09/01/10	7:50	0.00	0.00	0.00	Green	0.47	392.64	388.33	0.01	17.00	291.40	74.49	479.88	21.01	360.10	92.05
09/01/10	6:40	0.00	0.00	0.00	Mt Auburn	0.47	594.35	581.80	0.02	107.50	378.00	92.49	718.96	132.84	467.11	114.29
09/03/10	6:00	0.00	0.00	0.00	Cambridge	0.47	562.23	548.22	0.02	89.71	393.94	80.78	677.46	110.86	486.81	99.82
09/03/10	7:50	0.00	0.00	0.00	Green	0.47	1145.33	1135.44	0.01	137.80	743.40	248.57	1403.11	170.29	918.65	307.17
09/03/10	6:40	0.00	0.00	0.00	Mt Auburn	0.47	603.15	592.31	0.02	118.80	378.80	90.51	731.94	146.81	468.10	111.85
09/05/10	12:00	0.00	0.54	0.00	Cambridge	0.48	514.39	507.14	0.01	52.60	378.60	69.61	613.64	63.65	458.11	84.23
09/05/10	13:50	0.00	0.54	0.00	Green	0.48	742.84	739.30	0.00	106.61	483.62	144.91	894.55	129.00	585.18	175.34
09/05/10	12:40	0.00	0.54</td													

Table 17. Street cleaner removal efficiency composite sample pair collection dates, start times, locations, intake nozzle widths and resulting masses and yields. Precipitation data from Cambridge Department of Public Works gage, 147 Hampshire St, Cambridge, MA.
 [ft, feet; g, grams; lb/curb-mi, pounds per curb-mile; mm, millimeter; μm , micrometer]

Date	Sample street name	Vacuum nozzle width (ft)	Wet sample mass (g)	Dry sample mass (g)	Moisture content (percent)	Sample mass >2mm (g)	Sample mass <2mm to >125 μm (g)	Sample mass <125 μm (g)	Street-dirt yield (lb/curb-mi) >2mm (lb/curb-mi)	Street-dirt yield <2mm >125 μm (lb/curb-mi) (lb/curb-mi)	Street-dirt yield <125 μm (lb/curb-mi) (lb/curb-mi)
MULTIFAMILY PRE-STREET-CLEANING DATA											
5/11/2010	Broadway Pre	0.50	399.59	393.85	0.01	38.10	308.36	48.47	914.99	88.51	716.38
5/12/2010	Broadway Pre	0.50	352.34	343.37	0.03	31.54	252.21	60.69	797.72	73.27	585.93
6/8/2010	Broadway Pre	0.48	185.60	182.51	0.02	17.29	136.32	31.22	442.44	41.91	330.47
6/9/2010	Broadway Pre	0.48	298.62	295.69	0.01	30.61	203.25	56.88	715.57	74.08	491.86
7/13/2010	Broadway Pre	0.48	415.95	407.42	0.02	28.53	296.57	77.66	987.67	69.16	718.95
7/14/2010	Broadway Pre	0.48	387.07	326.22	0.16	60.67	246.49	15.24	790.83	147.08	597.54
8/10/2010	Broadway Pre	0.48	282.59	265.96	0.06	66.20	178.04	22.82	644.74	160.48	431.61
8/11/2010	Broadway Pre	0.48	619.88	607.45	0.02	105.09	407.16	94.32	1472.59	254.76	987.04
9/8/2010	Broadway Pre	0.48	--	--	--	--	--	--	--	--	--
9/14/2010	Broadway Pre	0.48	379.58	310.92	0.18	56.90	231.20	21.50	753.73	137.94	560.48
10/12/2010	Broadway Pre	0.48	554.91	335.53	0.40	145.77	177.40	14.90	813.39	353.38	430.05
10/13/2010	Broadway Pre	0.48	753.33	578.88	0.23	72.30	358.40	68.38	1403.33	175.27	868.84
12/8/2010	Broadway Pre	0.48	501.37	447.22	0.11	75.90	301.80	72.33	1082.27	183.68	730.36
12/14/2010	Broadway Pre	0.48	534.07	303.54	0.43	110.70	168.30	23.30	734.57	267.89	407.29
11/9/2010	Broadway Pre ¹	0.48	4843.14	1052.48	0.78	912.57	128.29	12.31	2547.00	2208.42	310.46
11/10/2010	Broadway Pre ²	0.48	--	--	--	--	--	--	--	--	--
5/11/2010	Fayette Pre	0.50	610.43	575.93	0.06	128.06	387.73	70.23	1338.00	297.51	900.77
5/12/2010	Fayette Pre	0.50	466.91	440.31	0.06	105.65	287.79	49.88	1022.93	245.45	668.59
6/8/2010	Fayette Pre	0.48	388.07	384.44	0.01	74.26	245.05	64.37	931.96	180.02	594.05
6/9/2010	Fayette Pre	0.48	257.63	250.24	0.03	57.81	146.18	43.30	605.58	139.90	353.76
7/13/2010	Fayette Pre	0.48	--	--	--	--	--	--	--	--	--
7/14/2010	Fayette Pre	0.48	252.35	221.66	0.12	46.18	150.65	24.48	537.35	111.95	365.21
8/10/2010	Fayette Pre	0.48	237.10	163.11	0.31	43.30	109.37	11.47	395.41	104.97	265.14
8/11/2010	Fayette Pre	0.48	392.22	375.19	0.04	97.54	229.03	48.13	909.54	236.46	555.22
9/8/2010	Fayette Pre	0.48	--	--	--	--	--	--	--	--	--
9/14/2010	Fayette Pre	0.48	357.13	257.64	0.28	70.10	163.60	30.40	624.57	169.94	396.60
10/12/2010	Fayette Pre	0.48	645.17	363.82	0.44	198.37	158.41	11.50	881.98	480.89	384.02
10/13/2010	Fayette Pre	0.48	1136.37	872.95	0.23	499.79	344.70	45.90	2116.21	1211.60	835.62
12/8/2010	Fayette Pre	0.48	369.16	249.44	0.32	127.51	106.81	18.84	603.64	308.57	258.48
12/14/2010	Fayette Pre	0.48	1811.24	679.57	0.62	374.66	254.50	43.64	1644.56	906.68	615.89
11/9/2010	Fayette Pre ¹	0.48	8186.58	1623.39	0.80	1420.11	176.80	21.53	3928.60	3436.67	427.86
11/10/2010	Fayette Pre ²	0.48	--	--	--	--	--	--	--	--	--
MULTIFAMILY POST-STREET-CLEANING DATA											
5/11/2010	Broadway Post	0.50	78.46	75.89	0.03	5.62	49.10	20.69	176.31	13.06	114.07
5/12/2010	Broadway Post	0.50	77.45	73.60	0.05	3.06	52.53	17.24	170.99	7.11	122.04
6/8/2010	Broadway Post	0.48	52.13	51.44	0.01	2.30	30.90	20.16	124.70	5.58	74.91
6/9/2010	Broadway Post	0.48	84.19	83.27	0.01	3.80	50.50	30.18	201.51	9.20	122.21
7/13/2010	Broadway Post	0.48	64.37	62.78	0.02	4.55	36.23	17.32	152.19	11.03	87.83
7/14/2010	Broadway Post	0.48	104.7	95.54	0.09	6.5	70.08	16.07	231.61	15.76	169.89
8/10/2010	Broadway Post	0.48	91.88	85.07	0.07	17.18	54.26	13.18	206.23	41.65	131.54
8/11/2010	Broadway Post	0.48	95.96	80.50	0.16	--	--	--	195.15	--	--
9/8/2010	Broadway Post	0.48	--	--	--	--	--	--	--	--	--
9/14/2010	Broadway Post	0.48	53.22	48.87	0.08	4.60	33.20	8.37	118.47	11.15	80.48
10/12/2010	Broadway Post	0.48	53.42	48.78	0.09	3.30	31.70	10.12	118.25	8.00	76.85
10/13/2010	Broadway Post	0.48	67.26	64.97	0.03	5.15	40.70	13.25	157.50	12.48	98.67
12/8/2010	Broadway Post	0.48	67.17	51.51	0.23	5.20	32.20	13.02	124.65	12.58	77.92
12/14/2010	Broadway Post	0.48	29.12	24.08	0.17	2.40	14.20	7.60	58.27	5.81	34.36
11/9/2010	Broadway Post ¹	0.48	211.05	33.75	0.84	2.00	23.60	3.57	81.67	4.84	57.11
11/10/2010	Broadway Post ²	0.48	--	--	--	--	--	--	--	--	--
5/11/2010	Fayette Post	0.50	229.06	220.76	0.04	37.16	144.25	38.92	512.87	86.33	335.12
5/12/2010	Fayette Post	0.50	46.28	42.14	0.09	1.89	25.69	15.06	97.90	4.39	59.68
6/8/2010	Fayette Post	0.48	84.96	83.05	0.02	9.76	39.36	31.95	201.33	23.66	95.42
6/9/2010	Fayette Post	0.48	68.73	67.91	0.01	2.89	37.58	27.93	164.34	6.99	90.94
7/13/2010	Fayette Post	0.48	65.90	65.03	0.01	2.18	36.67	22.04	157.65	5.28	88.90
7/14/2010	Fayette Post	0.48	39.05	30.94	0.21	5.12	21.58	3.94	75.01	12.41	52.31
8/10/2010	Fayette Post	0.48	50.31	43.61	0.13	--	--	--	105.72	--	--
8/11/2010	Fayette Post										

Table 17-continued. Street cleaner removal efficiency composite sample pair collection dates, start times, locations, intake nozzle widths and resulting masses and yields. Precipitation data from Cambridge Department of Public Works gage, 147 Hampshire St, Cambridge, MA.
 [ft, feet; g, grams; lb/curb-mi, pounds per curb-mile; mm, millimeter; µm, micrometer]

Date	Sample street name	Vacuum nozzle width (ft)	Sample										Street-dirt yield <2mm (lb/curb-mi)	Street-dirt yield >2mm (lb/curb-mi)	Street-dirt yield <2mm >125µm (lb/curb-mi)
			Wet sample mass (g)	Dry sample mass (g)	Moisture content (percent)	mass >2mm (g)	mass >125µm (g)	mass <125µm (g)	Street-dirt yield >2mm (lb/curb-mi)	Street-dirt yield <2mm >125µm (lb/curb-mi)	Street-dirt yield <125µm (lb/curb-mi)	Street-dirt yield <2mm >125µm (lb/curb-mi)			
COMMERCIAL PRE-STREET CLEANING DATA															
05/11/10	Cambridge Pre	0.50	179.24	174.83	0.02	26.13	125.38	19.56	406.17	60.71	291.28	56.80			
05/12/10	Cambridge Pre	0.50	234.75	228.32	0.03	20.40	173.10	34.29	530.43	47.39	402.15	79.66			
06/08/10	Cambridge Pre	0.48	156.53	153.74	0.02	15.41	114.72	26.89	372.70	37.36	278.11	65.19			
06/09/10	Cambridge Pre	0.48	277.23	274.69	0.01	22.99	203.83	45.38	664.75	55.64	493.27	109.82			
07/13/10	Cambridge Pre	0.48	163.65	150.94	0.08	18.09	115.76	15.22	365.91	43.85	280.63	36.90			
07/14/10	Cambridge Pre	0.48	321.46	277.47	0.14	43.80	209.31	22.11	672.65	106.18	507.41	53.60			
08/10/10	Cambridge Pre	0.48	154.12	137.16	0.11	29.94	97.70	10.58	332.50	72.58	236.85	24.22			
08/11/10	Cambridge Pre	0.48	382.57	371.60	0.03	28.08	275.69	68.23	900.84	68.07	668.33	165.40			
09/08/10	Cambridge Pre	0.48	--	--	--	--	--	--	--	--	--	--			
09/14/10	Cambridge Pre	0.48	226.74	206.06	0.09	52.45	134.69	18.64	499.53	127.15	326.52	45.19			
10/12/10	Cambridge Pre	0.48	--	--	--	--	--	--	--	--	--	--			
10/13/10	Cambridge Pre	0.48	453.77	316.37	0.30	102.41	185.35	27.57	766.95	248.26	449.33	66.84			
11/09/10	Cambridge Pre ¹	0.46	--	--	--	--	--	--	--	--	--	--			
11/10/10	Cambridge Pre	0.46	--	--	--	--	--	--	--	--	--	--			
12/08/10	Cambridge Pre	0.46	278.07	222.72	0.20	30.60	158.00	33.08	562.42	77.27	398.98	83.53			
12/14/10	Cambridge Pre	0.46	359.50	246.85	0.31	54.10	169.10	22.77	623.35	136.61	427.01	57.50			
05/13/10	Green Pre	0.50	270.73	266.73	0.01	33.55	190.37	41.85	619.67	77.94	442.27	97.23			
05/14/10	Green Pre	0.50	183.44	145.26	0.21	18.17	124.46	5.14	337.47	42.21	289.15	10.32			
06/09/10	Green Odd Pre	0.48	173.34	171.95	0.01	12.12	116.91	43.34	416.12	29.33	282.92	104.88			
06/11/10	Green Even Pre	0.48	167.32	149.39	0.11	21.65	116.02	13.34	361.52	52.39	280.77	32.28			
07/08/10	Green Pre Odd	0.48	155.00	151.89	0.02	17.85	96.17	32.96	364.25	42.81	230.63	79.04			
07/09/10	Green Pre Even	0.48	260.03	254.31	0.02	21.90	172.90	55.05	616.50	53.09	419.15	133.45			
08/12/10	Green Pre Odd	0.48	221.77	216.90	0.02	--	--	--	520.16	--	--	--			
08/13/10	Green Pre Even	0.48	211.24	204.65	0.03	13.74	133.40	55.61	496.11	33.31	323.39	134.81			
09/09/10	Green Pre	0.48	252.15	246.06	0.02	22.06	166.15	52.03	590.09	52.90	398.45	124.78			
09/10/10	Green Pre	0.48	313.81	307.62	0.02	28.00	197.70	82.19	745.73	67.88	479.27	199.25			
10/08/10	Green Pre 1	0.48	328.69	254.75	0.22	91.32	144.60	11.01	616.49	220.99	349.93	38.96			
10/14/10	Green Pre Odd	0.48	327.94	318.98	0.03	53.20	214.00	48.79	764.96	127.58	513.20	117.01			
10/29/10	Green Pre Odd	0.47	239.87	204.48	0.15	82.60	106.60	13.99	505.37	204.14	263.46	34.58			
11/12/10	Green Pre 1	0.47	1357.48	557.27	0.59	379.19	163.60	12.08	1377.29	937.16	404.34	29.86			
12/09/10	Green Pre	0.46	406.33	392.14	0.03	48.20	279.10	63.19	990.24	121.72	704.79	159.57			
12/10/10	Green Pre 1	0.46	279.35	267.32	0.04	46.08	186.78	34.12	675.04	116.36	471.66	86.16			
05/13/10	Mt. Auburn Even Pre	0.50	193.96	187.10	0.04	27.79	136.08	21.71	434.67	64.56	316.14	50.44			
05/13/10	Mt. Auburn Odd Pre	0.50	202.40	197.90	0.02	16.46	152.15	28.20	459.76	38.24	353.47	65.58			
06/09/10	Mt. Auburn Even Pre	0.47	264.51	263.03	0.01	24.21	194.27	41.71	651.23	59.94	480.99	103.27			
06/09/10	Mt. Auburn Odd Pre	0.47	171.06	169.77	0.01	22.29	108.72	38.11	420.33	55.19	269.18	94.36			
07/08/10	Mt. Auburn Pre Odd	0.48	219.31	213.10	0.03	34.51	139.65	37.42	516.60	83.66	338.54	90.71			
07/08/10	Mt. Auburn Pre Even	0.48	204.90	198.22	0.03	20.85	134.15	40.56	480.53	50.54	325.21	98.33			
08/12/10	Mt. Auburn Pre Even	0.48	404.18	395.93	0.02	21.89	298.99	71.70	959.82	53.07	724.81	173.82			
08/12/10	Mt. Auburn Post Odd	0.48	242.23	234.87	0.03	--	--	--	569.37	--	--	--			
09/09/10	Mt. Auburn Pre Even	0.48	554.22	529.76	0.04	172.70	313.38	43.19	1284.25	418.66	759.70	104.70			
09/09/10	Mt. Auburn Pre Odd	0.48	223.30	215.31	0.04	43.62	144.81	26.42	521.96	105.74	351.05	64.05			
10/14/10	Mt. Auburn Pre Even	0.48	322.27	299.56	0.07	40.20	208.70	48.98	726.20	97.45	505.93	118.74			
10/14/10	Mt. Auburn Pre Odd	0.48	265.43	251.87	0.05	43.65	172.90	32.58	610.59	105.82	419.15	78.98			
10/29/10	Mt. Auburn Pre Even	0.48	--	--	--	--	--	--	--	--	--	--			
10/29/10															